

**Air Travel Market Segments**  
**A New England Case Study**

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## **Introduction**

The 1995 American Travel Survey (ATS) is the first comprehensive survey of long distance travel patterns in two decades. The survey, conducted for the Bureau of Transportation Statistics by the Bureau of the Census, provides detailed information about the characteristics of long distance travel, including demographic information about the individuals and households who are traveling. It is, therefore, a useful resource for transportation planning purposes as well as travel market research.

This paper describes the results of using the New England region as a case study in air travel market research. Air travel market classifications are developed from the American Travel Survey data. The characteristics of the resulting market segments are explored in detail using additional information from the survey database. Some of the characteristics of the air travel market for New England are also compared to survey data available for Boston's Logan International Airport, the principal airport in the region.

## **Importance of Air Travel Market Research**

Although air travel accounts for a small proportion of the total travel activity in the United States, 15.6% of all person trips in 1995, it has grown significantly over the last twenty years. Increases in air travel have made ground access an important issue for many large airports and for the cities served by these airports. The ground transportation choices of an air traveler on his way to and from an airport are very different from those of a daily commuter. Therefore, information about the air travel market is important to planning transportation alternatives or systems that serve the traveler's needs. The type of information available in the American Travel Survey can only be replicated through individual airport passenger surveys.

## **Types of Air Travel Trips**

In broadly defined categories there are two basic trip purposes, the one taken primarily for business and the one taken for any number of non-business reasons, such as vacation, school, personal business, visiting relatives, etc. The American Travel Survey includes a variable describing the reason for a particular trip. For purposes of this analysis, a trip is considered a business trip if the reason given is business, combined business/pleasure, or convention, conference, or seminar. All other reasons are considered non-business in nature.

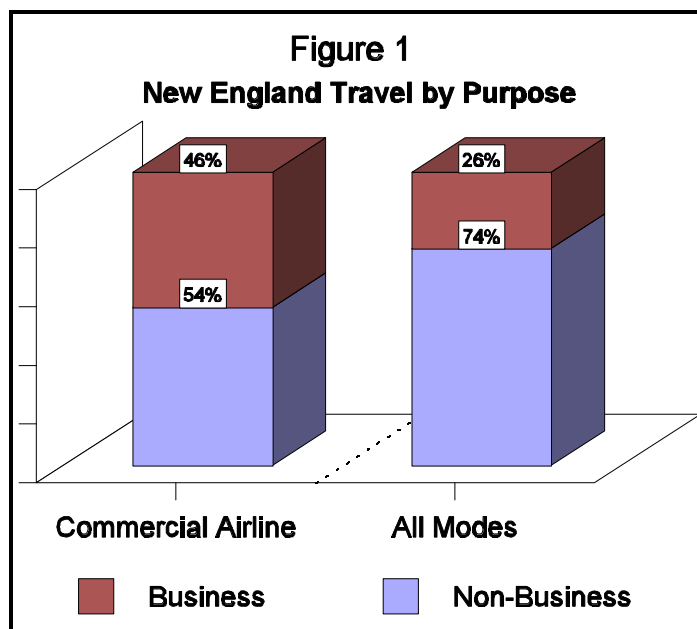
Traditionally, the airlines have segmented the air travel market into business and non-business classes and marketed their services accordingly. In addition to trip purpose, airport planners have further segmented the air travel market according to the geographic location in which the air traveler resides. Whether a traveler is a resident or non-resident of a region in which an airport is located has implications for the type of ground access mode that will be used to reach the airport. The two types of travelers make use of different access modes.

Four market segments result from classifying travelers according to where they live and the purpose of their trip. They are: resident business, resident non-business, non-resident business and non-resident non-business. American Travel Survey trips originating from a region are used to represent resident trips; trips destined for a region represent non-resident trips. This paper focuses specifically on those trips made by resident air travelers from New England, i.e., the air traveler who lives in New England and begins his or her trip from a major airport serving the region (a traveler is considered a resident if he travels to an airport by land-based modes).

The purpose of this research is to expand the traditional market classifications of air travelers to include demographic characteristics. These characteristics provide some insight into the various population groups that are traveling by commercial airline.

## New England Travel

The American Travel Survey defines a trip as ‘each time a person goes to a place at least 100 miles away from home and returns’. The ATS provides this trip information in two ways, in terms of persons and in terms of households. The ATS person trip description utilized in this paper is defined as a trip taken by an individual. Therefore, two people taking a trip equals two person trips or one person making two trips is also two person trips. A trip by air is any trip in which a commercial airplane was used to travel most of the distance. All references to trips or air travel trips in this paper imply person trips, whether or not explicitly stated. In 1995, commercial air trips accounted for 20% of all person trips originating in New England with auto responsible for almost all the remaining trips from the region. Figure 1 illustrates that 46% of the trips by



commercial airline from the New England region are for business reasons and 54% are made for non-business reasons. For all modes combined, trips taken primarily for business represent only 26% of total trips.

## Market Segmentation Procedure

Extracted from the ATS person trip file were all records meeting the following criteria: the origin region is New England, the principal mode of travel from origin to destination is commercial airline and the age of the person is over 19 years. SPSS Diamond, a software package that generates visual displays of statistically correlated variables, was used to

identify demographic variables in describing air traveler market segments. The tested variables

included information about the person traveling and characteristics of the household in which the traveler lived. The following variables were evaluated: race, Hispanic origin, gender, marital status, educational attainment, age, vehicles, household type, household size, and household income.

The five variables having some association with commercial air trips originating in New England are trip purpose, education, household income, gender, and household type. The data base for New England was then analyzed by AnswerTree, a software package that can be used in market segmentation analyses. The software allows the user to develop a classification system using various algorithms. The algorithms summarize statistically significant patterns and relationships among the fields and make decision rules. At each successive step, the decision rules are used to partition or segment the data into subgroups.

The decision tree is built on a focus or “root” variable. In this case gender is used as the focus variable. Trip purpose, household type, household income, and education are used to divide air travel person trips into successively smaller groupings. Based on the previous statistical correlations of the variables and a number of iterations of AnswerTree, the income variable was removed from the segmentation analysis. Income proved to be less important than education in the classification of air trips by gender. Furthermore, the addition of the income variable had a minimal impact on improving the performance of the segmentation analysis. The performance of the AnswerTree model is measured by what is termed a mis-classification index. For this analysis the resulting mis-classification index is .26, meaning that 74% of the person trips were accurately classified according to gender.

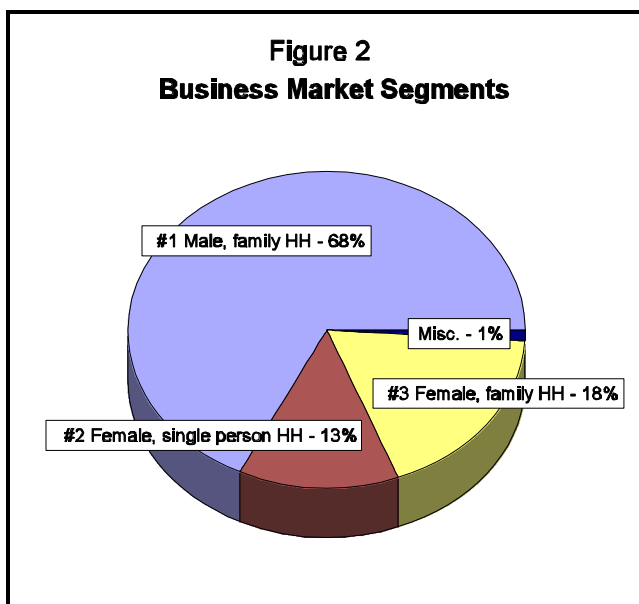
### **New England Air Travel Market Segments**

Nine market segments resulted from the segmentation analysis, three business classes and six non-business classes. The classifying variables are trip purpose, gender, household type and education. A small number of trips did not fit into any of the nine segments. These trips are placed in a category termed ‘miscellaneous’.

One variable, household type, composed of sixteen categories in the ATS, is collapsed into ten categories for this analysis. Married-couple family household categories 1 through 3 are collapsed into one category of family households with children under 18 years of age. Similarly, one parent family household ATS categories 5 through 7 and one parent family household ATS categories 9 through 11 each become one category of one parent family households with children under 18 years of age. All other household categories remain the same.

The market segments are homogeneous classes of trips based on the segmentation variables, but these variables alone do not provide sufficient information about the individuals responsible for the trips in each segment. Demographic variables, such as age and household income, that were not significant in classifying air travel trips can be useful in helping to understand the types of travelers that make trips. Therefore, to expand upon the information provided by the

segmentation process, each market segment is described using demographic information from the ATS associated with each of the market segments. One of the segmentation variables, 'trip purpose', divides trips into two classes, business and non-business. Business trips are then divided into three additional classes and non-business trips into six additional classes. The term 'educated' or 'well-educated', used in the following market segment descriptions, denotes an educational attainment of at least a four year college degree and the term 'lesser education' denotes less than a four year college degree.



### *Business Market Segments*

Business trips are divided into three classes of trips based on 'gender' and 'household type' variables. Figure 2 illustrates the proportional distribution of the business trip market segments.

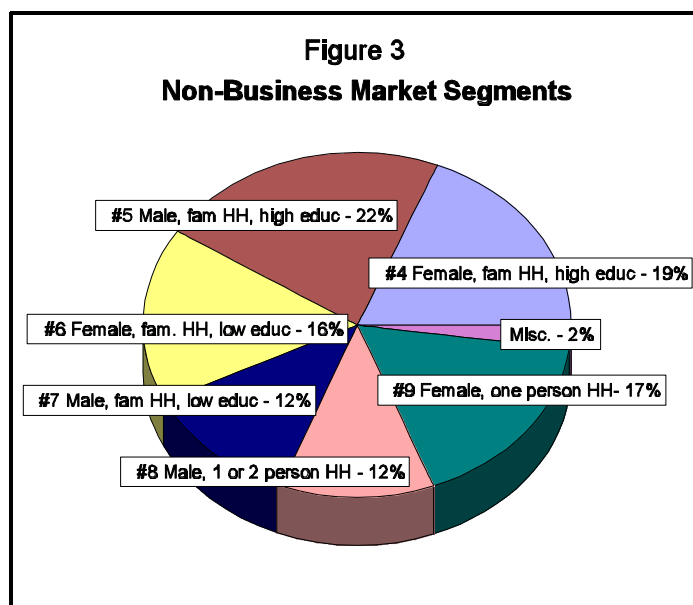
*Segment #1 Business trip by a male from a family household.* The single largest market category, accounting for 31% of all commercial air trips from the region and 68% of business trips, is composed of men from predominately married couple, family households. Only 11% of the trips are by men from single person or two person non-

family households. Fifty-one percent of the trips are made by an individual from a family with children under eighteen years of age, 35% by individuals from families without young children. Eighty percent of the trips are made by men from households with incomes greater than \$60,000. This is the highest income distribution of any market segment. Seventy-seven percent of the trips are made by an individual with an education of a bachelor's degree or higher. Almost 39% of the trips are attributable to men between the ages of 40 and 49 years.

*Segment #2 Business trip by a female from a single person household.* This market segment accounts for 13% of business trips by air. Female travelers from single person households account for 66% of the trips and the remaining 33% are either one parent family households (19%) or non-family households where the female is living with another person (13%). Almost all of the trips are made by a female who is either divorced or has never married. Seventy-five percent of the trips are evenly distributed among each of three ten-year age groupings, i.e., 30-39, 40-49, 50-59. Eighty-four percent of the trips are attributable to women with an education of a bachelor's degree or higher. Only 42% of the trips are taken by women with household incomes exceeding \$60,000.

*Segment #3 Business trip by a female from a family household.* This market segment, accounting for 18% of commercial air trips, is composed of women from married couple, two or more

persons, family households. There is a concentration of 33% of the trips in the 40-49 year age bracket and another 25% each in the next younger (30-39) and older (50-59) age brackets. The women responsible for trips in this category are almost equally divided into family households



with and without children under the age of 18. Almost two-thirds of the trips are made by women with a bachelor's degree or higher and three-quarters of the trips are from households where the income is above \$60,000. Over 90% of the trips are made by women who are married.

### *Non-Business Market Segments*

Non-business trips are divided into market segments based on 'gender' and 'household type' variables. However, the variable 'educational attainment' is also significant in classifying non-business trips. Six segments resulted from the classification process. They are displayed graphically in Figure 3.

*Segment #4 Non-business trip by a well-educated female from a family household.* Nineteen percent of non-business air trips from New England are represented by this class. All but 11% of the trips in the category are made by women from married couple, two or more person, family households, two-thirds of which have no children under 18 present. Slightly over half of the households are comprised of two persons, the remaining proportion is made of larger sized households. There are no trips by women from single person households in this group, but 11% of the trips are made by women living with another person in a non-family household. Eighty-three percent of the trips are made by married women with the remainder by women who have never married. All of the trips are by women with at least a bachelor's degree and 66% of the household incomes exceed \$60,000. In contrast to the business trip segments, only 63% of the trips are by a woman who is employed full-time, another 16% are employed part-time and 14% are full-time homemakers. There is a fairly even distribution of three-quarters of the trips across the three age categories of less than 30, 30-39, and 40-49 years.

*Segment #5 Non-business trip by a well-educated male from a family household.* The male counterpart of the previous class accounts for 22% of non-business air trips from New England. The distribution of household types is very similar to segment 4. All but 8% of the trips are made by men from family households, 58% of which have no children under the age of 18 present. There are no trips by men from single person households in this group. Similar to segment 4, 82% of the trips are by married men with the rest by men who have never married. Seven percent of the trips are by black men. All of the trips are made by men with a bachelor's degree or higher. Household incomes exceed \$60,000 in 70% of the cases. Twenty-nine percent of the trips are by

men between the ages of 40 and 49.

*Segment #6 Non-business trip by a female with lesser education from a family household.* This market segment accounts for 16% of New England non-business air trips. The trips are made by women from family households, 63% of which have no young children present. There are no trips by women from single person households in this group. Eighty-four percent of the trips are made by women who are married and 13% by women who have never married. The highest level of education achieved by individuals in this group is less than that required for a bachelor's degree. Household incomes exceed \$60,000 in only 45% of the trips taken. The highest concentration of trips in this segment is in the age bracket of over 60 years.

*Segment #7 Non-business trip by a male with lesser education from a family household.* This market accounts for 12% of New England non-business air trips. This class of trips is made by individuals who are the male counterparts of segment 6. The trips in this group are made by men from family households, 65% of which have no young children present. There are no trips by men from single person households in this group. Eighty-three percent of the trips are made by married men and 12% by men who have never married. Educational attainment does not exceed 'some college' for this group. Household income levels exceed \$60,000 in 55% of the cases. As in segment 6, there is a concentration of trips by men over the age of 60 (25%).

*Segment #8 Non-business trip by a male from a single person or two person household.* This segment accounts for 12% of New England non-business air trips. There is a small proportion of trips (14%) by men who are head of single parent family households with no children under the age of 18. The vast majority of trips are made by men from nonfamily households where they are living alone (43%) or living with another person (42%). There is a concentration of 34% of the trips in the 30-39 year age bracket. Household income exceeds \$60,000 in 50% of the trips. Thirty percent of the trips are by men who are divorced or widowed and 63% by men who have never married.

*Segment #9 Non-business trip by a female from a single person or one parent family household.* This group accounts for 17% of New England non-business air trips. Women responsible for the trips in this category live in predominantly single person households (59%), the remaining 41% of trips are made by women from single adult family households, (17% of these households have no young children and 24% have young children present). Only 22% of the trips are by a woman with a household income in excess of \$60,000; 13% of the trips are by non-white women, and about 5% by Hispanic women. Almost all of the trips are made by widowed (25%), divorced (30%), or never married (39%) women. About 44% of the trips are made by women who have received a four year college degree or higher. Twenty-eight percent of the trips are by women over the age of 60. This is the highest concentration of any market segment in the over 60 years age bracket.

## **Comparison of Air Travelers to Travelers Using All Modes**

A demographic profile of long distance trips from New England by all modes is presented in

Tables 1 and 2 and used as a base from which the demographic profiles of the air travel market segments can be reviewed. By comparing each market segment to all travelers from the New England region, one can evaluate the relative importance of groups of individuals to the makeup of the segment. Summary descriptions of market segment attributes are presented at the end of each table.

Table 1  
**New England - Long Distance Travel by Men**

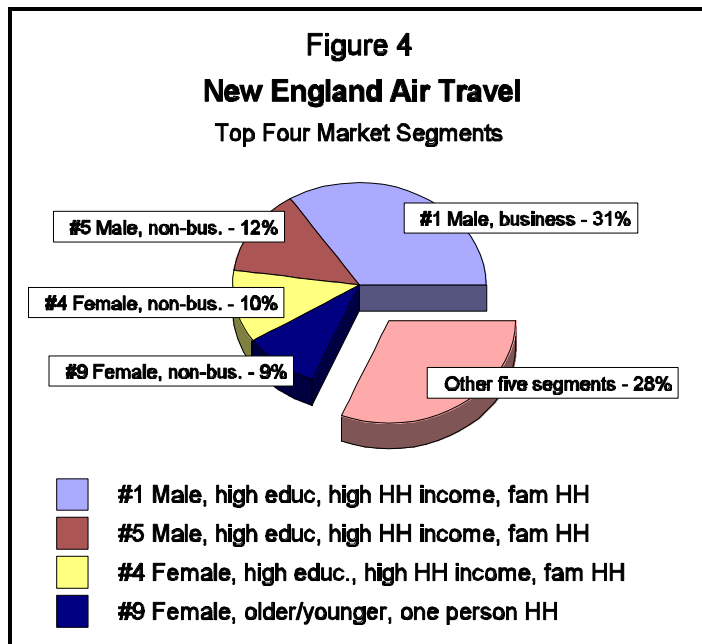
	Trips by All Modes	Trips by Commercial Airline			
		Market Segments			
		#1 Male business	#5 Male non-bus.	#7 Male non-bus.	#8 Male non-bus.
	New England Male	<i>HH type - family</i>	<i>HH type - family, Education - higher</i>	<i>HH type - family, Education - lesser</i>	<i>HH type - one or two person</i>
Age < 30	15%	6%	16%	14%	27%
30-39	22%	26%	22%	18%	34%
40-49	28%	39%	29%	21%	16%
50-59	18%	20%	15%	23%	8%
> 60	17%	9%	18%	25%	16%
HH size > 2	54%	65%	53%	51%	37%
HH income > \$60,000	56%	80%	70%	42%	50%
Race: white	96%	96%	91%	95%	91%
Mar. Status: Married, Divorced, Single	71%, 5%, 21%	86%, 5%, 8%	82%, 0%, 16%	83%, 4%, 12%	4%, 14%, 64%
Minimum of 4 yr. college degree	58%	77%	100%	0%	68%
Summary descriptions of market segments		High HH income, educated, married male, family HH; some men from 1 or 2 person HH	High HH income, educated, married male, family HH	Lower HH income, lesser education, married male, family HH	Average HH income, educated, young, unmarried male

Table 2  
New England - Long Distance Travel by Women

	Trips by All Modes	Trips by Commercial Airline				
		Market Segments				
	New England Female	#2 Female bus.	#3 Female business	#4 Female non-bus.	#6 Female non-bus.	#9 Female non-bus.
		<i>HH type - one person or one parent</i>	<i>HH type - family</i>	<i>HH type - family; Education - higher</i>	<i>HH type - family; Education - lesser</i>	<i>HH type - one person or one parent</i>
Age < 30	15%	16%	15%	24%	16%	23%
30-39	25%	25%	26%	26%	17%	14%
40-49	24%	26%	33%	23%	22%	13%
50-59	18%	27%	21%	16%	20%	23%
> 60	18%	6%	7%	11%	25%	28%
HH size > 2	46%	10%	60%	49%	58%	14%
HH income > \$60,000	46%	42%	74%	66%	45%	22%
Race: white	96%	97%	95%	97%	93%	87%
Mar. Status: Married, Divorced, Single	63%, 9%, 21%	0%, 36%, 57%	92%, 2%, 4%	83%, 0%, 16%	84%, 1%, 13%	3%, 30%, 39%
Minimum of 4 yr. college degree	47%	84%	65%	100%	0%	20%
Summary descriptions of market segment		Lower HH income, educated, unmarried female from 1 person HH; some 1 parent family HH's	High HH income, educated, married female from a family HH	High HH income, educated, younger, married female from a family HH	Lower HH income, lesser education, older, married, female from a family HH	Low HH income, lesser educ, older and younger, unmarried female from a 1 person HH

## Summary of Air Travel Market Segments

Clearly the most significant class of trips are those made by the male business traveler, married with children, educated and with very high household income. This group has the highest proportion of households with more than two persons. If one considers this segment as roughly one third of all air travel trips, another third is composed of the next three largest market segments, and the final third is comprised of the remaining five segments. This distribution is illustrated in Figure 4.



The second largest segment is also composed of men, in this case on a non-business trip. This group of trips is made by men who have the same characteristics as the male business market segment. In comparison to all long distance trips by men from New England, segment #2 and segment #5 have a higher proportion of household incomes over \$60,000 and a higher proportion of educated and married men. There is a higher proportion of larger sized households for segment #1 when compared with the region.

The third largest market group, segment #4, is composed of married women on non-business trips. This

group accounts for 10% of all commercial airline trips from New England. This group is the female counterpart to segment #5, married men on non-business trips. The principal difference is that all of the trips in segment #5 are made by women who have received at least a four year college degree. As is the case for their male counterparts, this group has a higher proportion of married women, a higher proportion of household incomes over \$60,000, and a similar proportion of households with more than two persons. The age distribution of this group is similar to that of all female travelers.

What is perhaps the most interesting of the top four market segments is that of #9. This market segment is composed of two distinct classes. One of the groups is young unmarried women under the age of 30. The income of this group is lower than that for all New England women who travel and only 44% have a four year college degree. This is to be expected since over one-third of the trips are made by women attending school. About 60% live alone and the rest live in a one parent family household. The other concentration of trips in this segment is that of older, retired women. The majority are widowed and living alone. Both groups in large part are traveling to visit relatives or friends.

The remaining five market segments equal 28% of all commercial airline trips. Two of the segments, #2 and #3 are females on business trips. Segment #2 represents 6% of all air travel trips and is primarily well-educated, unmarried women from one person households. Segment #3 represents 8% of all air travel trips and is an educated, married female from a family household with high household income. Segments #6 and #7 have similar demographic distributions and represent the female and male versions of the same traveler, a married individual with lesser education and lower household income from a family household. There are considerable numbers of older persons in these two segments. The segments account for 8% and 6% of all trips, respectively.

### **Comparison of ATS Data to Airport Passenger Survey Data**

Some airports, such as Boston's Logan International Airport, conduct periodic surveys of air passengers. The information obtained from these surveys is used in support of various business and planning projects. The 1995 Logan Air Passenger Survey was conducted during a two week period in April 1995 and administered to passengers waiting in departure lounges. The survey collected data on both resident and non-resident travelers from the region. Boston's Logan Airport is the largest in the region and handled the majority of New England's air travelers in 1995.

The Logan Air Passenger Survey defines resident air travelers, those who live in the region and begin their trip from a local origin, as residents of principally three states, Massachusetts, New Hampshire, and Rhode Island. Trips from the New England region were limited to air travel trips originating in the three states in order to compare the Logan Airport survey data to comparable ATS data. The Logan survey has a limited number of demographic variables, i.e., age, household income, household size, and gender in addition to trip purpose. The principal purpose of the survey is to collect information on travelers' air travel trips and their access choices to Logan Airport. Trip purpose based on ATS data for the Logan Airport resident market area is compared with the trip purpose distribution of resident air trips from the Logan Passenger Survey. In both cases the business/non-business split of travelers is the same, 46% and 54% respectively. Table 3 provides a comparison of the distribution of trips according to the four demographic variables common to both surveys. Any disaggregation of the four variables beyond what is shown is limited by the sample sizes of the Logan Air Passenger Survey. Household size, household income, and gender distributions for business and non-business trips are consistent between the two surveys. The age distribution of business trips for the Logan is more heavily weighted toward younger age groupings than the ATS. The age distributions for non-business trips is similar between the two surveys.

### **Summary and Conclusions**

Men from family households who are traveling on business account for almost one-third of the resident-based air travel market from New England. The remaining two-thirds of the New England market can be described using eight additional classes of trips. These groups range in size

from 6% to 12% of total trips. Two of the largest combined accounting for 22% of all trips are

Table 3  
**Boston Logan Airport  
Resident Air Travel Market**

		Logan Air Passengers <sup>1</sup> (trips by resident air travelers only)		New England Air Travelers <sup>2</sup> (trips from MA, NH, and RI only)	
		Business	Non-Business	Business	Non-Business
Gender	Male	71%	41%	68%	47%
	Female	29%	59%	32%	53%
	Total	100%	100%	100%	100%
Age	< 30	16%	23%	10%	24%
	30-39	32%	23%	27%	22%
	40-49	30%	21%	34%	20%
	50-59	17%	15%	21%	16%
	60+	5%	15%	7%	18%
	Total	100%	100%	100%	100%
Household Size	>2.	49%	40%	47%	42%
Household Income	% > \$60,000	79%	55%	75%	49%

<sup>1</sup> 1995 Logan Air Passenger Survey, Massport.

<sup>2</sup> 1995 American Travel Survey

men and women from family households on non-business trips. All three of these market segments are well educated and have higher household incomes than the other air travel segments.

Air travelers with quite different demographic characteristics from the largest three market segments are responsible for the remaining 47% of air travel trips from New England. Some of these groups of travelers, such as retirees or college students are spread across a number of market segments. This reflects socio-economic variations in the composition of these groups. The basis of this case study has been to explore the usefulness of demographic variables in describing air travelers and the trips they make. Although some groups are relatively homogeneous in their composition, others are not.

The value of segmenting air travel trips by means of demographic variables stems from what we learn about the life style characteristics of the travelers in each group. These life style characteristics are helpful in understanding reasons for using various airport access modes and planning services to meet travelers' needs. Likewise, life style characteristics of various air travel markets is of interest to airlines for marketing purposes.